SUMMARY

Seedling morphology

1. In the past, there have been studies on seedling morphology in relation to taxonomy. But there is no similar record of contribution from Indian plants.

2. In carrying out the present work, seedling materials were collected from natural sources and a few raised from nurseries.

3. Documentation of seedlings was done by photographs, drawings and herbarium specimens.

4. Some salient features of the plants under investigation were described together with their distribution, fruiting and flowering time.

5. Morphological features of each seedling were considered under several appropriate criteria.

6. A statistical synopsis of the investigated seedling taxa has been presented for 85 taxa under 70 genera belonging to 26 families.

7. Certain important morphological characters of seedlings only as well as some leaf characters of seedlings and adult plants are presented.

8. Phyllotaxy and type, shape and margin of leaf may be same throughout the seedling and adult plants. In cer-
tain taxa, these characters are variable in both forms, or there may be transitional.

9. Variation of seed characters in different taxa is mentioned. Such variation alongside other features has been utilized in the construction of keys to the identification of taxa in certain cases.

10. Different categories of germination and behaviour of testa as to cryptocotylar, semicryptocotylar and phanerocotylar situations have been explained. Their distribution pattern is 18, 4 and 63 respectively in number among the total assortment. In general, cryptocotyl and phanerocotyl germination respectively correspond to hypogeal and epigeal germination with a few exceptions.

11. The length of taproot varies considerably. Root characters are sometimes of diagnostic value. They possess various colours. Lateral roots may be branched or unbranched. The behaviour as well as emergence of taproots in *Hopea odorata*, *Shorea robusta* and *Thespesia populnea* are of interest during germination.

12. Hypocotyl is reduced in cryptocotylar seedlings and enlarged or well-developed in phanerocotylar seedlings. In certain taxa, distinct collet may be observed. A remarkable case with swollen hypocotyl is *Barringtonia acutangula*.

13. Cotyledons of the investigated taxa show as much diversity as the foliage leaves in terms of symmetry, size,
shape, etc. Some unusual features of cotyledons are also noteworthy, e.g. clasping petiole, colour and nature of testa remaining attached to cotyledons.

14. Paracotyledons exhibit a great diversity as to shape, apex, base, margin, venation, etc. Paracotyledonary stipules may prevail in certain seedlings.

15. Epicotyl is usually elongated in cryptocotylar seedlings and reduced in phanerocotylar ones. Epicotyl and internode may indicate different colours in a few taxa.

16. The nature of cataphylls, ephylls and metaphylls is pointed out.

17. Juvenile leaves are either simple or compound, but a combination of both is not uncommon.

18. Different traits of juvenile leaves are mentioned in connection with their distribution in various taxa.

19. Heteroblastic development of leaves as to type, shape, phyllotaxy, etc. has been interpreted.

20. A tentative classification of the investigated seedling taxa has been devised on the basis of morphological similarities and differences. Accordingly, the three groups (A, B and C) have been distinguished. Under groups B and C, there are three subgroups in each.

21. Some schemes for the classification of seedlings in different families, based on different criteria, have been provided including the present one.
22. Artificial keys for each group and subgroup have been constructed so as to facilitate easy identification of seedlings studied.

23. The probable significance for high incidence of phanerocotylar seedlings and cotyledons in a large number of phanerocotylar taxa are stated.

24. The status of cryptocotylar and phanerocotylar as to primitive or advanced has been explained in the light of present work together with previous reports.

25. Cryptocotylar seedlings are predominant within the polypetalous families.

26. The implications of above findings are discussed.

Seed coat anatomy

27. In the past, there have been various attempts to understand the anatomy of seed coat in relation to taxonomy, impermeability, seed germination, etc.

28. As there is no record of any Indian contribution on seed coat anatomy concerning seedling morphology, the present work was undertaken with this aim in view.

29. The collection of seed samples was done from the same sources as in the case of seedlings.

30. For anatomical studies, free-hand sections of seed coats were made and observed without staining to obtain natural
colour of different cells and tissues present in the seed coat.

31. In describing the anatomical structure total thickness of seed coat, testal and tegmic features have been emphasised.

32. The leguminous seeds are described with reference to palisade cells, hour-glass cells, mesophyll layer, etc.

33. An emphasis has been given on the importance of correlation between studies involving seeds and seedlings.

34. The overall study on the seedling morphology and seed coat anatomy reveals that there is a bearing of characters from one to those of the other.

35. The implications of above findings are stated.